DOI:
10.1136/postgradmedj-2015-133371

Document Version
Peer reviewed version

Title: Approaches to managing uncertainty in people with life limiting conditions: role of communication and palliative care.

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Key Words: Palliative care. Uncertainty. Communication. Terminally ill patients.

Word count: 2446/2000-3000

Abstract

Patients with any major illness can expect to experience uncertainty about the nature of their illness, its treatment, and their prognosis. Prognostic uncertainty is a particular source of patient distress among those living with life limiting disease. Uncertainty also affects professionals and it has been argued that the level of professional tolerance of uncertainty can affect levels of investigation as well as healthcare resource use.

We know that the way in which uncertainty is recognised, managed and communicated can have important impacts on patients' treatment and quality of life. Current approaches to uncertainty in life limiting illness include the use of care bundles and approaches that focus on communication and education. The experience in communicating in difficult situations that specialist palliative care professionals can provide may also be of benefit for patients with life limiting illness in the context of uncertainty.

Whilst there are a number of promising approaches to uncertainty, as yet few interventions targeted at recognising and addressing uncertainty have been fully evaluated and further research is needed in this area.

Main Messages:

- Uncertainty will always be present in life limiting illness, and if poorly recognised and managed, can impact adversely on patient outcomes.
- When managing uncertainty, professionals should consider what their patients' may prioritise in situations of uncertainty.
- Interventions exist to assist in the management of uncertainty, but need further evaluation. Promotion of communication between patients and professionals, education interventions, and integration of palliative care are promising approaches.

Introduction

William Osler is quoted as saying medicine is the science of uncertainty.(1) Following this uncertainty has and will probably always remain a key aspect of medicine. Despite advances in medicine over the past century, uncertainty prevails alongside illness. As diagnostic tests, treatments and the healthcare system itself become ever more complex, patients, with any major illness, can expect to experience a great deal of uncertainty about the nature of their illness, its treatment, and their prognosis.

Clinicians too experience uncertainty every day. A major part of the doctor's role is to assess and manage uncertainty in terms of the risk/benefit of deciding to operate on a patient, the value of investigating and then managing a symptom in a patient with limited prognosis, or in responding to patients' difficult questions.

All of these uncertainties can be present in life limiting illness. However, prognostic uncertainty is an additional source of patient and professional distress among those living with life limiting disease. The age old question 'how long have I got, doctor?' is one that many still struggle to answer. This article therefore aims to examine in detail the concept of uncertainty in illness; and its impact on patients and professionals. We then appraise current practice and evidence in addressing uncertainty in life limiting illness, and suggest an ideal approach.

What is uncertainty in illness?

Uncertainty is not a simple or easily defined concept and a situation of uncertainty usually results from several inter-related factors. Mishel was one of the first researchers to develop an overarching theory of uncertainty in illness which aimed to explain the underlying processes governing patients' experiences of uncertainty.(2) She identified four concepts that contributed to an uncertain state– complexity, unpredictability, ambiguity, and lack of information.(2-4) In her concept analysis of uncertainty in illness, McCormick further developed these ideas and described situations of uncertainty in terms of the probability of events occurring, the temporality of events, and individuals' perceptions of their situation.(5) (See figure 1)

Any given situation of uncertainty may be made up of several of these factors, but equally, there are many forms of uncertainty in healthcare.(6) In her discussion of uncertainty as applied to the primary care consultation, Greenhalgh defined 4 broad areas: uncertainty regarding the illness itself & the evidence base; uncertainty about a patient's story; uncertainty about what best to do for a patient; and the uncertainty of multi-professional collaborative care(7). A key point to add to this taxonomy is that patients and clinicians may understand and appraise uncertainty differently – some uncertainties are patient driven, and others are professional.

Research contributions have considered healthcare professional responses to uncertainty over a 50-year timescale.(8, 9) Earlier research focused on the ways in which professionals 'cover' uncertainty to present a definite plan. For example, one paper noted that 'physicians to be' were 'trained for control' rather than trained for uncertainty.(10) More recent research has examined health care

professionals' engagement with uncertainty and the impacts of uncertainty on professionals and patients.(11) (See also later section)

<FIGURE 1 HERE>

The additional uncertainties of advanced life-limiting illness.

At all stages of life-limiting illness, the difficulty in predicting prognosis represents an additional source of uncertainty.(13) A growing body of research has been undertaken into the illness trajectory and prognostication in life-limiting illness, yet some degree of prognostic uncertainty usually remains, even when life expectancy is short.(14, 15)

Despite this we know a lot about prognosis and illness trajectories. We know that the trajectory of decline in terminal cancer is different to that of organ failure, different to renal failure, and different again to frailty and dementia.(16-18) We can also identify poor prognostic features of many illnesses, and in some situations, very well validated scores (such as, for example, the APACHE 2 score (19)) exist to help predict outcome. But the task of prognostication has its limits and analysis has demonstrated that a proportion of deaths are sudden and unexpected.(20) Prognostication remains difficult in the last 6 months of life: A review of prognostic indicators found that they have insufficient sensitivity or specificity when predicting prognoses shorter than 6 months in non-cancer.(21, 22) A study of 149 deaths on medical wards in an acute hospital identified that 38% of deaths weren't expected on admission – they either occurred suddenly, or following an unpredictable dying trajectory.(23) Another study of prognostication by expert clinicians observed only one out of every five prognostic estimates was within 33% of actual survival (n=).(13, 24) Whilst prognostication may be refined further in the future, it remains to some extent an art rather than a science,(25) and prognostic uncertainty is likely to remain a common feature in advanced illness.

Some early approaches in the uncertainty literature argued that the clinician's role is to reduce or remove uncertainty,(8, 10, 26, 27) but it is now considered that as an abstract concept, uncertainty is neutral cognitive state. (28, 29) It is rather the appraisal of uncertainty that can lead to its protective or harmful effects. Mishel acknowledged that uncertainty can be experienced positively as 'opportunity' or negatively as 'danger,' but also suggested that the role of 'structure providers', including clinicians, is to reduce uncertainty.(4) (See figure 2)

<FIGURE 2 HERE>

As we have seen, elimination of uncertainty in advanced illness is unlikely to be achievable. It is also known that some patients hold on to uncertainty in a protective manner to shield themselves from a poor prognosis,(30) and that over-expression of uncertainty can lead to poorer decision satisfaction for patients.(31) Knowing this, it is clear that any approach to uncertainty needs to be nuanced and patient specific, particularly because the level of uncertainty experienced in advanced illness is likely to fluctuate over time. (11, 32, 33)

Why does uncertainty matter? How does it impact on patients, families and professionals?

Uncertainty matters because it affects patients with life-limiting illness, their family & carers at a profoundly emotional level.(32) Qualitative studies of patient experiences in a wide range of illnesses including cancer, heart failure, chronic lung disease, multimorbidity, and hospital inpatients have elucidated that uncertainty significantly impacts on patients' lives. (34-39) Patients who are uncertain about their futures can become preoccupied with this uncertainty and sometimes overwhelmed to the extent that their sense of self is impacted.(40) A majority of patients wish to discuss this uncertainty.(41, 42). Research suggests this rarely happens. (43)

It has been shown that if uncertainty is not appropriately addressed this can result in worse psychological outcomes for patients.(44-46). Uncertainty is linked to anxiety in its association with fear of the future.(44, 47) There are additional potential impacts on the patient-professional relationship if uncertainty is imperfectly expressed; Politi et al found that greater communication of clinician uncertainty during decision making about breast cancer treatment led to poorer decision satisfaction for patients.(31) Blanch et al found that medical students who make more expressions of uncertainty during their interactions with patients are less well regarded.(48)

Uncertainty also impacts on clinician's practice and their confidence; clinicians frequently struggle with uncertainty which can result in overtreatment or over-investigation,(49) increased costs,(45, 50) and lack of communication with patients about their future.(51, 52) Some have gone further than this, arguing that intolerance of uncertainty is leading to a culture of chronic disease where every abnormality is classified as pathology.(53) Further, it could be argued that training for clinicians to manage uncertainty is lacking – less than 20% of current UK postgraduate medical training curricula contain detailed recommendations and curriculum goals relevant to dealing with uncertainty.(54)

It is not possible to eliminate prognostic or other uncertainty in life limiting illness, and so a paradigm focused purely on uncertainty reduction is inappropriate.(32) But as we have shown, unrecognised or poorly addressed uncertainty can lead to negative patient and healthcare outcomes. It is therefore paramount to appropriately address uncertainty in patients with life limiting illness. The complexity of the concept means that an individualised and nuanced approach is likely to be most beneficial.(55)

Addressing uncertainty: current strategies.

There is a range of current practice in addressing uncertainty in life-limiting illness, but three main approaches are evident.

1. Disengagement or minimisation of uncertainty –Evidence indicates that uncertainty is commonly either unrecognised or recognised and unaddressed.(51) Systematic reviews of communication in Chronic Obstructive Pulmonary Disease (COPD) and heart failure observed that discussions of end of life care (EOLC) and prognosis rarely occurred (41, 56). Multiple barriers to discussion of prognosis in advanced illness are evident including; lack of time, lack of expertise, fear of taking away hope by removing protective uncertainty, disagreement within teams about the level of

disclosure(41, 42) and perhaps this accounts for why in many settings uncertainty remains underserved.

2. The care bundle approach – In the hospital setting, tools such as the AMBER care bundle, or the Psychosocial Assessment and Communication Evaluation tool (PACE) have been developed with the intention to aid recognition and management of clinically uncertainty situations.(57, 58) The AMBER care bundle was developed for patients who are deteriorating, with uncertain recovery and who are at risk of dying in the next 1 – 2 months. (57) It comprises an identification phase, followed by the development of a clear medical plan for patients identified as fulfilling the criteria in conjunction with the patient and their family. The individual patient-centred plan is then reviewed daily. The care bundle, which includes roles for the entire medical team emphasises clear communication and planning. This approach is promising and recent research suggests that there may be some benefits; awareness of prognosis appeared to be higher among patients supported by the AMBER care bundle.(35) However a full evaluation of the efficacy of this approach is needed. Moreover, a recent single centre study identified that rather than being used as a tool to identify patients with an *uncertain* recovery, the care bundle was principally used when it became *certain* that patients would not recover.(23)

3. Education/Communication approach – Communication is key to all patient interaction and this is no different when addressing uncertainty. Approaches thus far have focused either on patient education or training of healthcare professionals. Cognitive behavioural therapy based interventions directed at patients to improve their resilience and ability to cope with uncertainty have shown some success.(59, 60) Related are patient activation interventions aimed at encouraging patients to engage more closely with long term illness, though there is less evidence in advanced or life limiting disease.(61) Others have suggested the use of mindfulness based practice, a way of self-reflection in the present moment,(62) as a possible helpful tool in changing how uncertainty is appraised by patients, though as yet little empirical evidence supports the use of mindfulness in this context.(44, 63)

   Education of health professionals to cope better with & communicate more effectively the uncertainties of advanced illness is the other approach. This is consistent with the suggestion that all healthcare professionals dealing with patients with advanced life limiting disease are providing 'generalist palliative care', whilst specialist palliative care providers have a role in supporting other professionals in providing this care.(64) Courses such as the *Sage and Thyme* approach(65) or *Transforming End of Life Care*(66) provide multidisciplinary training for non-specialist staff in communication, holding difficult conversations and dealing with clinical uncertainty in life limiting illness. Other disease specific training programmes focused on communication have shown to aid discussion of prognosis and preferences for end of life care in COPD,(67) and to alter interview style for physicians.(68) These programmes may empower health professionals to recognise and address uncertainty in life limiting illness. All warrant evaluative scrutiny.

Addressing Uncertainty – the way forward?

Whilst several different approaches exist to manage uncertainty in life limiting illness, there is not sufficient evidence to identify a 'best method'. There is evidence that if addressed poorly or unaddressed, uncertainty is detrimental to patient and family care, but there is little evidence supporting the use of any of the approaches outlined above, and no comparative studies exist. Further research and evaluation of these approaches is needed. In the meantime, there are some principles which can guide our approach.

First, the way in which patients' understand and process uncertainty is key to its impact. In some situations, uncertainty may be maintained for its protective effect (e.g. not seeking to find out about prognosis to avoid bad news), but in others it may have deleterious effects (e.g. when waiting for a potentially life-threatening diagnosis). **Any approach to uncertainty therefore needs to take an individual view based on the situation and a patient's experience**. To date, no approach has done so. Ongoing unpublished qualitative research suggests that patients' response to uncertainty in life limiting illness may usually be explained by three main factors, and perhaps it is these that should form the basis of future uncertainty-addressing interventions: 1. Level of engagement with illness and treatment, 2. Information needs and preferences & 3. Temporal focus (present or future).

Second, uncertainty is experienced differently and at different times by patients and professionals. Patient-professional differences in experience and understanding of uncertainty can be expected to result in differences in agendas, and increase the risk of patients' concerns going unaddressed (as has been noted in other settings(69)). Interventions addressing uncertainty by targeting this patient-professional gap might be expected to improve outcomes. (Figure 3)

<FIGURE 3 HERE>

Third, evidence indicates that careful discussion with all stakeholders is needed to ensure the best communication of prognosis and prognostic uncertainty, especially in complex situations.(70) Poor communication was a major failing identified by the report into the use (and misuse) of the Liverpool Care Pathway.(71) Research indicates that careful communication regarding prognosis can be beneficial in life limiting illness.(72) It is therefore reasonable to expect that the additional support and experience in communicating in difficult situations that specialist palliative care professionals can provide may lead to benefits for patients with life limiting illness in the context of uncertainty. By prioritising clear communication and care planning, the palliative care approach is promising in providing support for patients with life limiting illness experiencing uncertainty, and is worth evaluating in this context.

Conclusion:

Clinicians can, and should not eliminate uncertainty in life limiting illness. Nor is it their role to blindly discuss all uncertainties with every patient. But uncertainty, particularly prognostic uncertainty, requires greater thought and should be more frequently considered in order to achieve

the best outcomes for patients with life limiting illness and their families. Appropriate communication in these often complex situations is paramount. There is scope for care bundle-based or education-based interventions to provide benefit although these require rigorous evaluations. In addition, the palliative care approach promotes in depth individual assessment of each patient's concerns, and this is potentially very helpful to the process of addressing uncertainty. Further research in this area is needed to evaluate the impact of existing approaches and those in development.

Current Research Questions:

- Do currently used interventions targeted at addressing uncertainty improve outcomes for patients?
- What is the longer term impact of 'protective uncertainty' on patient outcomes, and should this uncertainty ever be challenged?
- Can the use of the palliative care approach itself affect outcomes in the context of uncertainty?
- How can palliative care be integrated into care for patients with lif limiting illness and uncertain prognosis?

True False Questions

- Prognostic uncertainty should always be discussed with patients with life limiting disease. True/False
  Answer: false – this depends on the individual patient's communication preferences
- Care bundles have been shown to improve quality of life in situations of uncertainty. True/False
  Answer: False – further evaluation is needed, though some care bundles show promising effects in preliminary evaluation.
- Any approach to uncertainty needs to be patient specific and depends on patients' level of engagement with their illness. True/False
  Answer: True
- Patients with COPD and Heart failure have similar end of life disease trajectories. True/False
  Answer: True – patients with COPD and heart failure tend to follow a similar illness trajectory with exacerbations and remissions.
- Professionals' recognition and management of uncertainty has potentially large cost implications. True/False
  Answer: True – there is some evidence that intolerance of uncertainty affects ordering of investigations, and healthcare cost

Key References

1. Mishel MH. The measurement of uncertainty in illness. Nursing Research. 1981; 30(5):258-63.
2. McCormick KM. A Concept Analysis of Uncertainty in Illness. Journal of Nursing Scholarship. 2002; 34(2):127-31.
3. Lunney JR, Lynn J, Foley DJ, Lipson S, Guralnik JM. Patterns of Functional Decline at the End of Life. Journal of the American Medical Association. 2003; 289(18):2387-92.
4. Barclay S, Momen N, Case-Upton S, Kuhn I, Smith E. End-of-life care conversations with heart failure patients: A systematic literature review and narrative synthesis. British Journal of General Practice. 2011; 61(582):e49-e62.
5. Murtagh F. Can palliative care teams relieve some of the pressure on acute services? BMJ: British Medical Journal. 2014; 348.

References:

1. Osler W. Aequanimitas: With Other Addresses to Medical Students, Nurses and Pratitioners of Medicine: P. Blakiston; 1922.
2. Mishel MH. The measurement of uncertainty in illness. Nursing Research. 1981 ;30(5):258-63.
3. Mishel MH. Reconceptualization of the Uncertainty in Illness Theory. Image: the Journal of Nursing Scholarship. 1990;22(4):256-62.
4. Mishel MH. Uncertainty in Illness. Image: the Journal of Nursing Scholarship. 1988;20(4):225-32.
5. McCormick KM. A Concept Analysis of Uncertainty in Illness. Journal of Nursing Scholarship. 2002;34(2):127-31.
6. Kirkegaard P, Risor MB, Edwards A, Junge AG, Thomsen JL. Speaking of risk, managing uncertainty: decision-making about cholesterol-reducing treatment in general practice. Quality in Primary Care. 2012;20(4):245-52. PubMed PMID: 23113909.
7. Greenhalgh T. Uncertainty and Clinical Method. Clinical Uncertainty in Primary Care: Springer; 2013. p. 23-45.
8. Fox RC. The evolution of medical uncertainty. Milbank Memorial Fund Quarterly, Health and Society. 1980 ;58(1):1-49.
9. Ghosh AK. Understanding medical uncertainty: A primer for physicians. Journal of Association of Physicians of India. 2004 ;52(SEP):739-42.
10. Light D, Jr. Uncertainty and Control in Professional Training. Journal of Health and Social Behavior. 1979;20(4):310-22.
11. Gerrity MS, DeVellis RF, Earp JA. Physicians' Reactions to Uncertainty in Patient Care: A New Measure and New Insights. Medical care. 1990;28(8):724-36.
12. Barber K. The Canadian oxford dictionary: Oxford University Press Canada; 1998.
13. Christakis NA, Lamont EB, Smith JL, Parkes CM. Extent and determinants of error in doctors' prognoses in terminally ill patients: prospective cohort studyCommentary: Why do doctors overestimate? BMJ (Clinical research ed). 2000;320(7233):469-73.
14. Glare P, Virik K, Jones M, Hudson M, Eychmuller S, Simes J, et al. A systematic review of physicians' survival predictions in terminally ill cancer patients. BMJ Open. 2003 2003-07-24 21:58:37;327(7408):195.
15. O'Callaghan A, Laking G, Frey R, Robinson J, Gott M. Can we predict which hospitalised patients are in their last year of life? A prospective cross-sectional study of the Gold Standards Framework Prognostic Indicator Guidance as a screening tool in the acute hospital setting. Palliative Medicine. 2014;28(8):1046-52.
16. Lunney JR, Lynn J, Foley DJ, Lipson S, Guralnik JM. Patterns of Functional Decline at the End of Life. Journal of the American Medical Association. 2003 ;289(18):2387-92.
17. Lunney JR, Lynn J, Hogan C. Profiles of older medicare decedents. J Am Geriatr Soc. 2002 Jun;50(6):1108-12. PubMed PMID: 12110073. Epub 2002/07/12. eng.
18. Murtagh FE, Sheerin NS, Addington-Hall J, Higginson IJ. Trajectories of illness in stage 5 chronic kidney disease: a longitudinal study of patient symptoms and concerns in the last year of life. Clinical Journal of the American Society of Nephrology. 2011;6(7):1580-90.
19. Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II: a severity of disease classification system. Crit Care Med. 1985;13(10):818-29.
20. Sara Blackmore AP, Julia Verne. Predicting Death: Estimating the proportion of deaths that are ‘unexpected’ United Kingdom: 2011.
21. Coventry PA, Grande GE, Richards DA, Todd CJ. Prediction of appropriate timing of palliative care for older adults with non-malignant life-threatening disease: a systematic review. Age and ageing. 2005;34(3):218-27.
22. Boyd K, Murray SA. Recognising and managing key transitions in end of life care. BMJ (Clinical research ed). 2010 2010-09-16 23:10:02;341.

23. Etkind S, Karno J, Edmonds PM, Carey I, FEM M. Supporting patients with uncertain recovery: The use of the AMBER care bundle in an acute hospital. BMJ Supportive & Palliative Care. 2015;5(1):95-8.
24. Christakis NA, Iwashyna TJ. Attitude and self-reported practice regarding prognostication in a national sample of internists. Archives of Internal Medicine. 1998;158(21):2389-95.
25. Cowie MR. The fine art of prognostication. European Heart Journal. 2002 December 1, 2002;23(23):1804-6.
26. Eddy DM. Variations in physician practice: the role of uncertainty. Health Affairs. 1984 May 1, 1984;3(2):74-89.
27. Berger CR, Calabrese RJ. Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. Human communication research. 1975;1(2):99-112.
28. Hilton B. Perceptions of uncertainty: its relevance to life-threatening and chronic illness. Critical care nurse. 1992;12(2):70-3.
29. Mishel MH. Uncertainty in acute illness. Annual review of nursing research. 1997;15(1):57-80.
30. McCormack LA, Treiman K, Rupert D, Williams-Piehota P, Nadler E, Arora NK, et al. Measuring patient-centered communication in cancer care: a literature review and the development of a systematic approach. Social science & medicine. 2011 Apr;72(7):1085-95. PubMed PMID: 21376443.
31. Politi MC, Clark MA, Ombao H, Dizon D, Elwyn G. Communicating uncertainty can lead to less decision satisfaction: a necessary cost of involving patients in shared decision making? Health Expectations. 2011;14(1):84-91.
32. Brashers DE. Communication and Uncertainty Management. Journal of Communication. 2001;51(3):477-97.
33. Politi MC, Han PKJ, Col NF. Communicating the uncertainty of harms and benefits of medical interventions. Medical Decision Making. 2007 ;27(5):681-95.
34. Selman L, Harding R, Beynon T, Hodson F, Coady E, Hazeldine C, et al. Improving end-of-life care for patients with chronic heart failure:“Let’s hope it’ll get better, when I know in my heart of hearts it won’t”. Heart. 2007;93(8):963-7.
35. Bristowe K, Carey I, Hopper A, Shouls S, Prentice W, Caulkin R, et al. Patient and carer experiences of clinical uncertainty and deterioration, in the face of limited reversibility: A comparative observational study of the AMBER care bundle. Palliative Medicine. 2015 March 31, 2015.
36. Hoth KF, Wamboldt FS, Strand M, Ford DW, Sandhaus RA, Strange C, et al. Prospective impact of illness uncertainty on outcomes in chronic lung disease. Health Psychology. 2013 ;32(11):1170-4.
37. Donovan EE, Brown LE, LeFebvre L, Tardif S, Love B. “The Uncertainty Is What Is Driving Me Crazy”: The Tripartite Model of Uncertainty in the Adolescent and Young Adult Cancer Context. Health Communication. 2015 2015/07/03;30(7):702-13.
38. Pinnock H, Kendall M, Murray SA, Worth A, Levack P, Porter M, et al. Living and dying with severe chronic obstructive pulmonary disease: Multi-perspective longitudinal qualitative study. BMJ (Clinical research ed). 2011;342(7791):268.
39. Mason B, Nanton V, Epiphaniou E, Murray SA, Donaldson A, Shipman C, et al. ‘My body's falling apart.’ Understanding the experiences of patients with advanced multimorbidity to improve care: serial interviews with patients and carers. BMJ Supportive & Palliative Care. 2014 May 28, 2014.
40. Nanton V, Munday D, Dale J, Mason B, Kendall M, Murray S. The threatened self: Considerations of time, place, and uncertainty in advanced illness. British Journal of Health Psychology. 2015:n/a-n/a.

41. Barclay S, Momen N, Case-Upton S, Kuhn I, Smith E. End-of-life care conversations with heart failure patients: A systematic literature review and narrative synthesis. British Journal of General Practice. 2011 January;61(582):e49-e62. PubMed PMID: 2011286997.
42. Momen N, Hadfield P, Kuhn I, Smith E, Barclay S. Discussing an uncertain future: End-of-life care conversations in chronic obstructive pulmonary disease. A systematic literature review and narrative synthesis. Thorax. 2012 September;67(9):777-80. PubMed PMID: 2012494681.
43. Wright AA, Zhang BZ, Mack JW, Trice E, Balboni T, Mitchell SL, et al. Association between end of life discussions, patient mental health, medical care near death , and caregiver bereavement adjustment. JAMA. 2008;300(14):1665-73.
44. Wright L, Afari N, Zautra A. The illness uncertainty concept: A review. Current Science Inc. 2009 2009/04/01;13(2):133-8. English.
45. Thorne SE, Bultz BD, Baile WF. Is there a cost to poor communication in cancer care?: a critical review of the literature. Psycho-Oncology. 2005;14(10):875-84.
46. Mishel MH, Hostetter T, King B, Graham V. Predictors of psychosocial adjustment in patients newly diagnosed with gynecological cancer. Cancer Nursing. 1984;7(4):291-300.
47. Nicholas Carleton R, Sharpe D, Asmundson GJG. Anxiety sensitivity and intolerance of uncertainty: Requisites of the fundamental fears? Behaviour Research and Therapy. 2007 10;45(10):2307-16.
48. Blanch DC, Hall JA, Roter DL, Frankel RM. Is it good to express uncertainty to a patient? Correlates and consequences for medical students in a standardized patient visit. Patient Education and Counseling. 2009 9;76(3):300-6.
49. Kassirer JP. Our Stubborn Quest for Diagnostic Certainty. New England Journal of Medicine. 1989;320(22):1489-91. PubMed PMID: 2497349.
50. Shapiro NI, Bates DW. Response: The Unacceptable Costs of Trying to Achieve “Diagnostic Certainty”. The Journal of Emergency Medicine. 2010 10;39(4):501-2.
51. Helft PR, Chamness A, Terry C, Uhrich M. Oncology nurses' attitudes toward prognosis-related communication: A pilot mailed survey of oncology nursing society members. Oncology Nursing Forum. 2011 Jul;38(4):468-74. PubMed PMID: 2011-16677-010.
52. Elkington H, White P, Higgs R, Pettinari CJ. GPs' views of discussions of prognosis in severe COPD. Family Practice. 2001;18(4):440-4. PubMed PMID: 2001296686.
53. Meador CK. The last well person. The New England journal of medicine. 1994 Feb 10;330(6):440-1. PubMed PMID: 8284021. Epub 1994/02/10. eng.
54. GMC. List of Approved Specialty and Sub-Specialty Curricula: General Medical Council; [cited 2016 March 9th]. Available from: http://www.gmc-uk.org/education/approved_curricula_systems.asp.
55. Brashers DE, Neidig JL, Haas SM, Dobbs LK, Cardillo LW, Russell JA. Communication in the management of uncertainty: The case of persons living with HIV or AIDS. Communication Monographs. 2000 2000/03/01;67(1):63-84.
56. Knauft E, Nielsen EL, Engelberg RA, Patrick DL, Curtis JR. Barriers and facilitators to end-of-life care communication for patients with COPD. Chest. 2005 Jun;127(6):2188-96. PubMed PMID: 15947336. Epub 2005/06/11. eng.
57. Carey I, Shouls S, Bristowe K, Morris M, Briant L, Robinson C, et al. Improving care for patients whose recovery is uncertain. The AMBER care bundle: design and implementation. BMJ supportive & palliative care. 2014:bmjspcare-2013-000634.
58. Higginson IJ, Koffman J, Hopkins P, Prentice W, Burman R, Leonard S, et al. Development and evaluation of the feasibility and effects on staff, patients, and families of a new tool, the Psychosocial Assessment and Communication Evaluation (PACE), to improve communication and palliative care in intensive care and during clinical uncertainty. BMC Medicine. 2013;11(1).
59. Jiang X, He G. Effects of an uncertainty management intervention on uncertainty, anxiety, depression, and quality of life of chronic obstructive pulmonary disease outpatients. Research in Nursing & Health. 2012;35(4):409-18.

60. Mishel MH, Germino BB, Belyea M, Stewart JL, Bailey, Donald E. Jr., Mohler J, et al. Moderators of an Uncertainty Management Intervention: For Men With Localized Prostate Cancer. Nursing Research. 2003;52(2):89-97.
61. Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions: a review. Patient Education and Counseling. 2002 10;48(2):177-87.
62. Epstein RM. Mindful practice. JAMA : the journal of the American Medical Association. 1999;282(9):833-9.
63. Brown KW, Ryan RM. The benefits of being present: mindfulness and its role in psychological well-being. Journal of personality and social psychology. 2003;84(4):822.
64. Murtagh F. Can palliative care teams relieve some of the pressure on acute services? BMJ: British Medical Journal. 2014;348.
65. Connolly M, Perryman J, McKenna Y, Orford J, Thomson L, Shuttleworth J, et al. SAGE & THYME™: A model for training health and social care professionals in patient-focussed support. Patient education and counseling. 2010;79(1):87-93.
66. Transforming End of Life Care: King's College London; 2014 [cited 2016 March 11th]. Available from: http://www.kcl.ac.uk/lsm/research/divisions/cicelysaunders/research/evaluating/TransformingEndofLifeCare/index.aspx.
67. Au DH, Udris EM, Engelberg RA, Diehr PH, Bryson CL, Reinke LF, et al. A randomized trial to improve communication about end-of-life care among patients with COPD. Chest. 2012 Mar;141(3):726-35. PubMed PMID: 21940765. Pubmed Central PMCID: PMC3415164. English.
68. Jenkins V, Fallowfield L. Can communication skills training alter physicians' beliefs and behavior in clinics? Journal of Clinical Oncology. 2002;20(3):765-9.
69. Heritage J, Maynard DW. Problems and Prospects in the Study of Physician-Patient Interaction: 30 Years of Research. Annual Review of Sociology. 2006;32:351-74.
70. Anderson W, Cimino J, Ungar A, Pollice L, Shotsberger K, Carson S, et al. Keys to communicating about prognosis in the ICU: A multicenter study of family, provider, and expert perspectives (FR424-C). Journal of Pain and Symptom Management. 2013 February;45 (2):382. PubMed PMID: 70988699.
71. Neuberger J. More care, less pathway: a review of the Liverpool Care Pathway. 2013.
72. Fallowfield LJ, Jenkins VA, Beveridge HA. Truth may hurt but deceit hurts more: Communication in palliative care. Palliative Medicine. 2002;16(4):297-303.

Figure Legends:

Figure 1: Terms associated with uncertainty in illness. (Adapted from Mishel and McCormick and as defined by Barber 1998)(4, 5, 12)

Figure 2: Mishel's model of perceived uncertainty in illness (reproduced with permission)

Figure 3: patient/professional interaction in situations of uncertainty. A) patient- professional communication gap present with no cross communication of agendas. B) theoretical effect of an intervention to close communication gap